Constraint-induced movement therapy

van der Lee, J.H.; Beckerman, H.; Lankhorst, G.J.; Bouter, L.M.

published in
Archives of Physical Medicine and Rehabilitation
1999

DOI (link to publisher)
10.1016/S0003-9993(99)90339-8
10.1016/S0003-9993(99)90339-8

document version
Publisher's PDF, also known as Version of record

DEPARTMENTS

Letters to the Editor

Constraint-Induced Movement Therapy

Kunkel and colleagues[1] recently published an article on constraint-induced (CI) movement therapy for motor recovery in chronic stroke patients. They presented the results of an uncontrolled series of 5 stroke patients undergoing CI therapy. The authors also presented a review of five studies, including their own, concerning the effectiveness of CI therapy based on a calculation of effect sizes. We have several concerns with this paper.

In our opinion, research in physical medicine and rehabilitation has progressed to a point at which patient series no longer make any substantial contribution to the accumulation of knowledge. Controlled studies, preferably randomized, are needed to determine the effectiveness of treatment modalities. Uncontrolled studies can be misleading and will almost always report grossly overestimated treatment effects.[2] The importance of a control group, when evaluating CI therapy, is emphasized by the interim conclusions of a controlled study carried out by Wittenberg and colleagues,[3] who found that patients who received standard therapy also showed improvement, possibly due to expectation bias. The results of a randomized clinical trial conducted at our hospital, which will be published shortly, confirm this.[4]

In their literature review, Kunkel and colleagues claim to have identified two controlled studies. However, the publication on one of these studies mentions a control group of 15 patients, but provides no data concerning improvement in either the experimental or the control group.[5] Therefore, we were puzzled by the fact that Kunkel presented data on the experimental group of 20 patients in this study, but no data on the control group.

Finally, we strongly disagree with the interpretation of effect sizes based on trends over time in uncontrolled series as important evidence in favor of CI movement therapy. In fact, when using within-group time trends to calculate effect sizes, all the methodologic advantages of having a control group are ignored. We conclude that Kunkel failed to demonstrate that CI therapy is efficacious for chronic stroke patients.

Johanna H. van der Lee, MD
Heleen Beckerman, PhD, PT
Gustaaf J. Lankhorst, MD, PhD
University Hospital Vrije Universiteit
Lex M. Bouter, PhD
Institute for Research in Extramural Medicine
Vrije Universiteit
Amsterdam, The Netherlands

References

1. Kunkel A, Kopp B, Muller G, Villringer K, Villringer A, Taub E, et al. Constraint induced movement therapy for motor recovery in chronic stroke patients. Arch Phys Med Rehabil 1999;80:624-8.
2. Sackett DL, Haynes RB, Guyatt GH, Tugwell P. Clinical epidemiology. A basic science for clinical medicine. Boston/Toronto/London: Little, Brown and Company; 1995.
3. Wittenberg G, Chen R, Ishii K, Croarkin E, Eckloff S, Gerber N, et al. Effect of constrant-induced movement therapy on motor function and cortical physiology in chronic stroke. Presented at the 2nd World Congress on Neurological Rehabilitation, Toronto, April 1999.
4. Van der Lee JH, Wagenaar RC, Lankhorst GJ, Vogelaar TW, Devillé WL, Bowter LM. Forced use of the upper extremity in chronic stroke patients: results from a single-blind randomized clinical trial. Stroke (Forthcoming).
5. Taub E, Crago JE, Uswatte G. Constraint-induced movement therapy: a new approach to treatment in physical rehabilitation. Rehabil Psychol 1998;43:152-70.

The authors reply

Van der Lee and colleagues are correct in emphasizing that randomized controlled studies are preferable to uncontrolled studies; however, replications of clinical series still have a place in rehabilitation research. As noted in our report, we sought to perform an independent replication of the effects of constraint-induced movement therapy, which had only been fully tested in coauthor Taub's laboratory.[1,2] A similar replication without a control group appeared recently in *Stroke*.[3] Since CI treatment is a new and promising therapy, we believe that these independent replications are still viable, as was also suggested by Ottenbacher.[4] The paper by Wittenbacher and associates[5] is a preliminary report with still-unpublished data and no conclusions can be drawn from it. The meta-analysis was limited to pre-post effect sizes, since only two of the studies we reported contained a control group. Control group effect sizes could thus not have been pooled for the demonstration of the overall effect we wanted to report. Finally, we want to point out that we tested the effects of CI therapy in a sample of highly chronic stroke patients where spontaneous recovery has never been demonstrated and we want to emphasize that the effects reported here were substantial and long-lasting.

We believe that these independent replications in two laboratories have established the efficacy of CI therapy for the treatment of chronic stroke without claiming the specificity of the observed effect. We agree with van der Lee that now would be the time to compare these effects to those of other treatment approaches to evaluate to what extent the effects we observed are actually related to specific behavioral training rather than reflecting nonspecific therapy effects.

Herta Flor, PhD
Bruno Kopp, PhD
Annett Kunkel
Department of Psychology,
Humboldt-University
D-10117 Berlin, Germany

References

1. Taub E, Miller NE, Novack TA, Cook EW III, Fleming WC, Nepomuceno CS, et al. Technique to improve chronic motor deficit after stroke. Arch Phys Med Rehabil 1993;74:347-54.
2. Taub E, Wolf SL. Constraint induced movement techniques to facilitate upper extremity use in stroke patients. Top Stroke Rehabil 1997;3:38-61.
3. Miltner WH, Bauder H, Sommer M, Dettmers C, Taub E. Effects of constraint-induced movement therapy on patients with chronic motor deficits after stroke: a replication. Stroke 1999;30:586-92.
4. Ottenbacher KJ. Why rehabilitation research does not work (as well as we think it should). Arch Phys Med Rehabil 1995;76:123-9.
5. Wittenberg G, Chen R, Ishii K, Croarkin E, Eckloff S, Gerber NL, et al. Effect of constraint-induced movement therapy on motor function and cortical physiology in chronic stroke. Poster presented at